Chapter Two

Gastrointestinal Diseases

Overview

Gastrointestinal (GI) diseases*, also referred to as enteric diseases, may cause nausea, vomiting, and diarrhea in those affected. Campylobacteriosis, *Escherichia Coli* 0157:H7 (*E coli*), salmonellosis, and shigellosis are caused by bacteria while giardiasis is caused by protozoa. All are significant public health concerns as they may be spread via the food or water supply and through personal contact with others.

Salmonellosis and campylobacteriosis transmission is closely associated with poultry. Many cases of campylobacteriosis are associated with handling raw poultry or eating undercooked poultry meat. Salmonella can be found inside normal-appearing eggs, and if the eggs are eaten raw or undercooked, the bacteria can cause illness.[1] Giardiasis is principally transmitted through intake of contaminated water. Water contaminated with human waste or with the waste of animals such as beaver, dogs, and cats may serve as a source of giardia.[2] Once infected, a person can transmit any of these diseases by the fecal-oral method. Poor handwashing practices by an employee of a food establishment or a child-care facility may result in an outbreak of disease.

Shigellosis is easily transmitted from person to person since as few as 10 – 100 organisms may cause disease. The disease may also be contracted through contaminated water and milk and may be spread by flies that contaminate uncovered foods. Shigellosis can be a serious problem in day cares, jails, and in other instances of crowding. Poor sanitation and handwashing techniques may lead to outbreaks. In homes where a case of shigellosis is diagnosed, in as much as 40% of the time a second case will be diagnosed in a person residing within the home.[3]

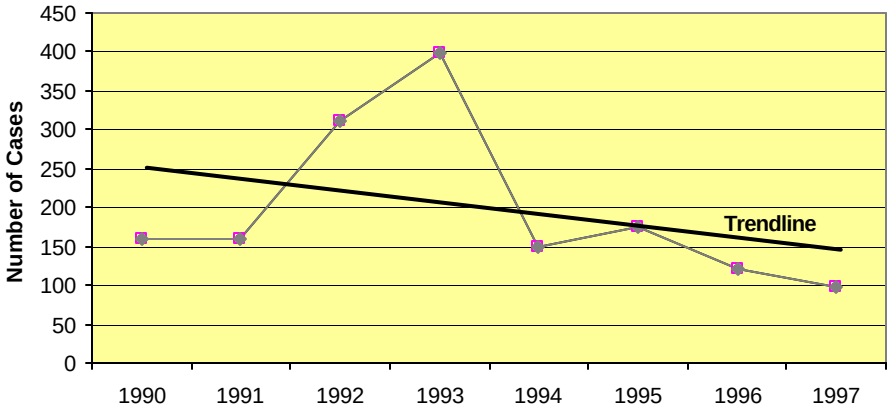
Escherichia coli 0157:H7 first came to public attention in 1982 as a result of two outbreaks traced to contaminated ground beef eaten at fast food restaurants.[4] Diarrhea caused by this bacillus ranges from mild and nonbloody to stools that are virtually all blood. A complication of this infection, hemolytic uremic syndrome (HUS), causes acute kidney failure. Acute kidney failure is the leading cause of death in children who die as a result of *E Coli* 0157:H7 infection.[5]

Trend

A total of 1,573 cases of gastrointestinal diseases have been reported in Davidson County from 1990 through 1997, on average, 197 cases per year. The definition of this category is modified to include *E Coli* 0157:H7 for years 1996 and 1997 due to the emergence of the disease as a significant public health threat and its addition to the list of notifiable diseases and conditions in Tennessee in October 1995. One case of *E Coli* 0157:H7 was reported in Davidson County in 1996 and two cases in 1997. The number of GI diseases reported in 1990 and 1991 was almost identical. Reporting doubled in 1992 and reached the peak of 399 cases in 1993. The most significant decrease in the number of reported cases occurred from 1993 to 1994. Only 99 cases were reported in 1997, less than any other year of the eight-year period. See figure 1.

* In this report, GI diseases includes campylobacteriosis, *Escherichia Coli* 0157:H7, giardiasis, salmonellosis, and shigellosis.

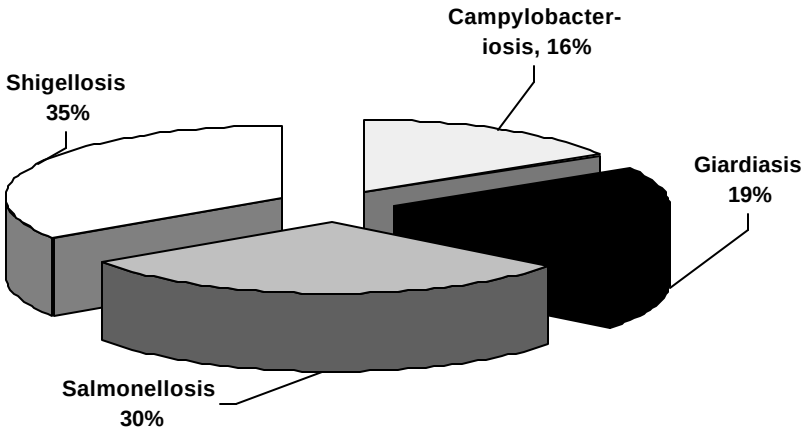
Figure 1 : Reported Gastrointestinal Diseases*
Davidson County, Tennessee, 1990 - 1997



*Includes Campylobacteriosis, Giardiasis, Salmonellosis, and Shigellosis for years 1990 through 1997 and *E Coli* 0157:H7 for years 1996 & 1997

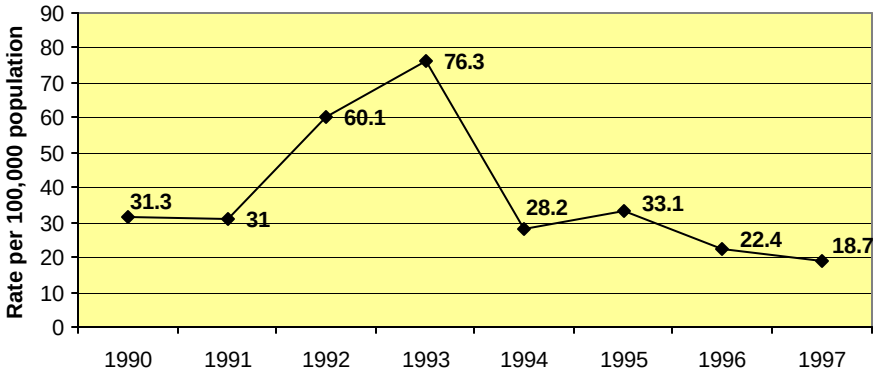
Of the 1,573 GI diseases reported during the period of 1990 through 1997, 34% were shigellosis, 30% were salmonellosis, 19% were giardiasis, and 16% were campylobacteriosis. Figure 2 examines the aggregate eight-year percentage of each individual disease in the total of reported GI diseases.

Figure 2 : Percent of Gastrointestinal Diseases by Type,
Davidson County, Tennessee, 1990 - 1997



The incidence, number of cases per 100,000 population, of gastrointestinal diseases is represented in figure 3. In 1993, the peak year for reported cases of GI diseases, the rate was 76.3.

Figure 3 : Incidence Rate of Reported Gastrointestinal Diseases* Davidson County, Tennessee 1990 - 1997



*Includes campylobacteriosis, giardiasis, salmonellosis, and shigellosis (rate per 100,000): 1996 & 1997 also includes *E Coli* 0157:H7

Who had more reported cases of gastrointestinal disease in Davidson County?

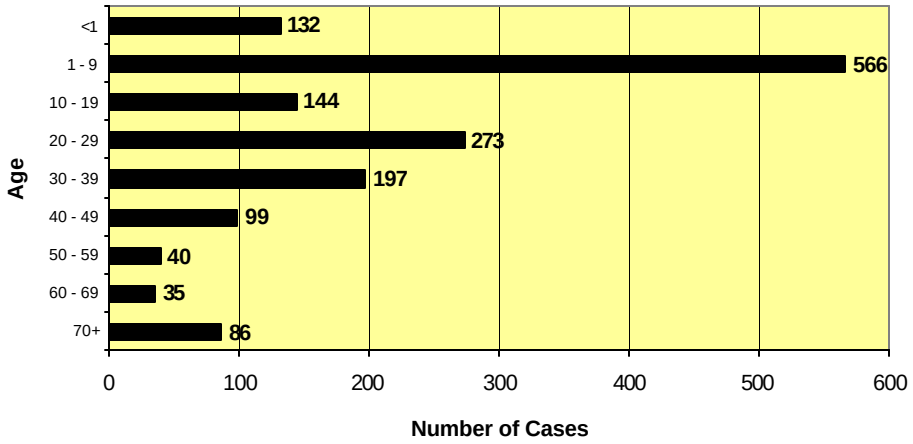
Gastrointestinal diseases reported in Davidson County from 1990 through 1997 occurred most often in persons who were:

- Children between the ages of 1 - 9.
- Adults between the ages of 20 - 29.

Age

As shown in figure 4, gastrointestinal diseases significantly affect children under ten years of age. Thirty-six percent of the reported cases were in children between the ages of one and nine. The young adult age groups ages 20 - 29 and children aged 10 - 19 were infected at the next highest frequency. This ranking of the age groupings holds true in each of the individual diseases comprising the GI category with the exception of campylobacteriosis. Campylobacter affected primarily the young adult group of 20 – 29 years followed by the 1 – 9 year old children. In addition, children under the age of one year were reported with campylobacteriosis less frequently than for the other GI diseases.

Figure 4 : Reported Gastrointestinal Diseases by Age*
Davidson County, Tennessee, 1990 - 1997

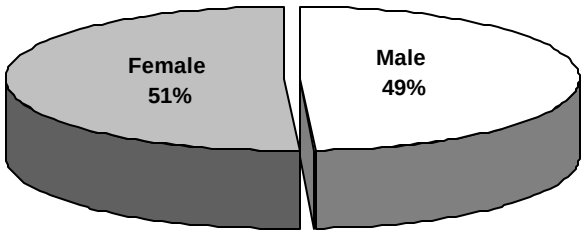


* Not represented: one case age unknown

Gender

The reported gastrointestinal diseases were distributed almost equally among males and females (51% female and 49% male). See figure 5. However, reported giardiasis and campylobacteriosis cases occurred more frequently in males than females (56% male and 44% female in both instances).

Figure 5 : Percent of Reported Gastrointestinal Diseases by Gender*, Davidson County, Tennessee 1990 - 1997

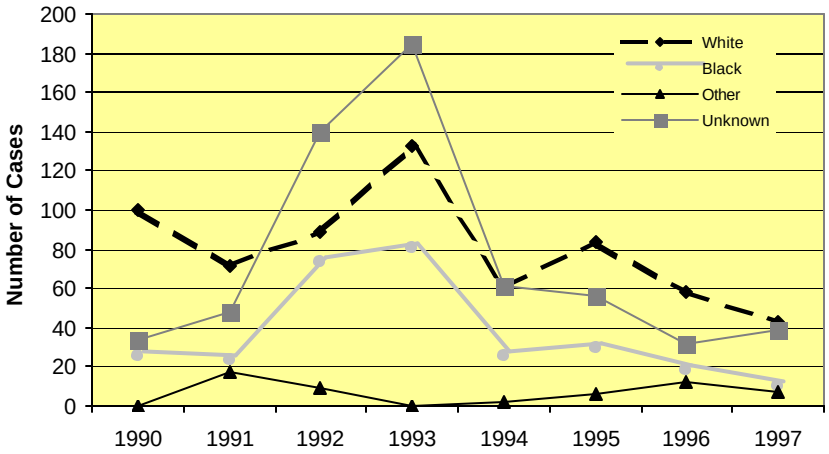


*Not included: 3 cases gender unknown

Race

Race information is not available for 595 (38%) of the 1,573 reported cases of GI diseases. Of the cases where race information is available, 638 cases were of the white race, 287 were black, and 53 cases were of other races. See figure 6.

Figure 6 : Reported Gastrointestinal Diseases* by Race, Davidson County, Tennessee, 1990 - 1997



*Includes campylobacteriosis, giardiasis, salmonellosis, and shigellosis; 1996 & 1997 also include E Coli 0157:H7

Table 1 represents the numbers of reported cases of gastrointestinal diseases by race and gender.

Table 1: Reported Cases of Gastrointestinal Diseases by Race and Gender*, Davidson County, Tennessee, 1990 - 1997

	All Races			White			Black			Other			Unknown		
Year	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female
1997	99	54	45	43	23	20	10	4	6	7	4	3	39	23	16
1996	120	61	59	58	31	27	18	8	10	12	4	8	32	18	14
1995	176	91	85	84	44	40	30	15	15	6	2	4	56	30	26
1994	149	73	76	60	29	31	26	13	13	2	1	1	61	30	31
1993	399	198	200	133	62	71	81	38	43	0	0	0	185	98	86
1992	311	156	154	89	40	49	73	34	38	9	8	1	140	74	66
1991	159	75	84	71	32	39	23	10	13	17	7	10	48	26	22
1990	160	66	93	100	37	62	26	10	16	0	0	0	34	19	15
Total	1,573	774	796	638	298	339	287	132	154	53	26	27	595	318	276

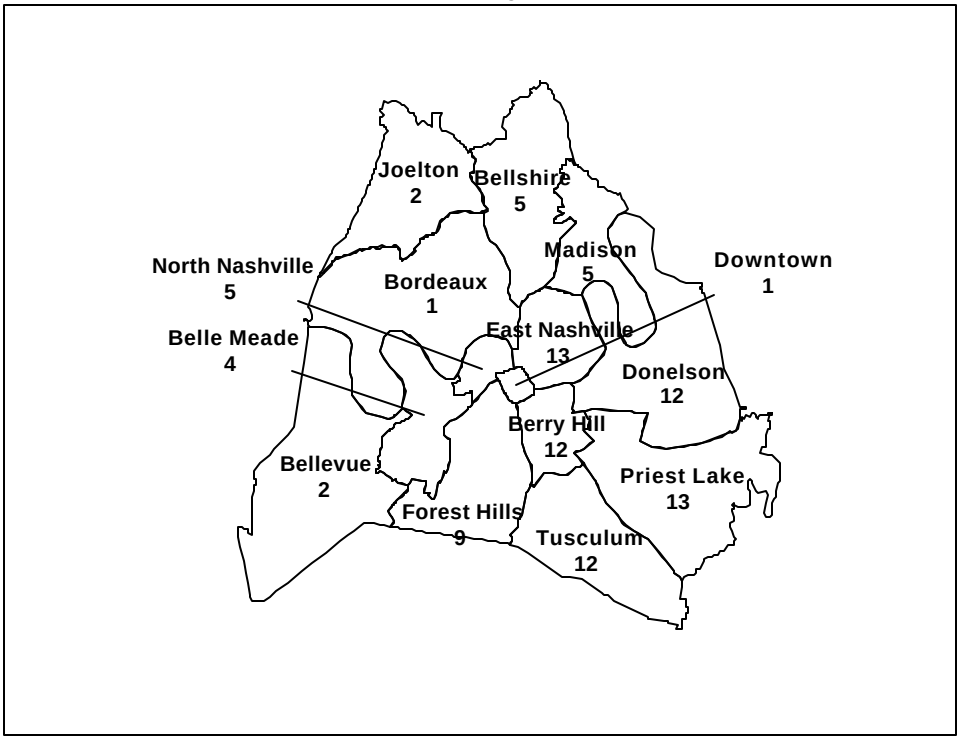
*Does not include 3 cases gender unknown

Where were the most gastrointestinal diseases reported in Davidson County in 1997?

In 1997, more than half (62%) of the reported gastrointestinal diseases reported were in the communities of:

- East Nashville/Inglewood 13%
- Priest Lake/Antioch 13%
- Berry Hill/Woodbine 12%
- Tusculum/Crieve Hall 12%
- Donelson/Hermitage 12%

Map 1 : Reported Cases of Gastrointestinal Disease by Planning District*, Davidson County, Tennessee, 1997



*Davidson County is divided into 14 planning districts (see Technical Notes). Three cases are not shown in this map due to unavailability of planning district information.

How does Davidson County rank within Tennessee in reported cases of gastrointestinal diseases?

Davidson County ranked third highest among the four largest metropolitan areas of Tennessee in number of GI diseases reported. Shelby County had the highest incidence of reported GI disease in the state, followed by Hamilton County. Davidson County's rate is less than half of Shelby's rate. See Table 2.

Table 2 : Comparison of Gastrointestinal Disease Rates per 100,000 Population, 1997

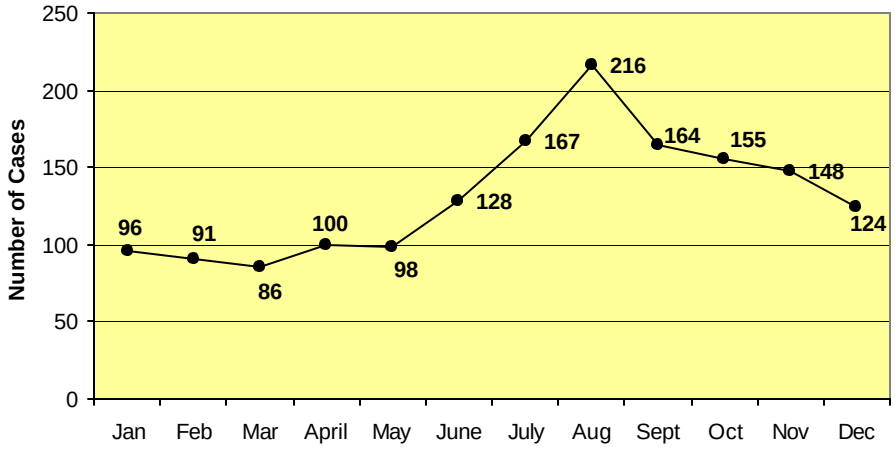
	Davidson		Hamilton*		Knox*		Shelby*		Tennessee*	
Disease	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Campylobacteriosis	13	2.4	13	4.4	48	13.1	37	4.2	296	5.5
E Coli 0157:H7	2	0.4	7	2.4	4	1.1	4	0.5	50	0.9
Giardiasis	13	2.4	8	2.7	15	4.1	44	5.0	176	3.3
Salmonellosis	43	8	33	11.1	32	8.7	106	12.1	443	8.3
Shigellosis	28	5.2	28	9.4	7	1.9	146	16.7	291	5.4
All GI Diseases	99	18.4	89	30.0	106	28.9	337	38.5	1,256	23.4

*Data from Assessment Information Manager (AIM), Tennessee Department of Health

When were the most gastrointestinal diseases reported?

Of total reported gastrointestinal diseases from 1990 through 1997, sixty-two percent were reported during the months of June through November. See figure 7.

Figure 7 : Reported Gastrointestinal Diseases by Month of Report, Davidson County, Tennessee, 1990 - 1997



This pattern is true of each disease with the exception of giardiasis. Giardiasis was reported most often from September through December. See figure 8.

Figure 8 : Comparison of Gastrointestinal Diseases by Month of Report, Davidson County, Tennessee, 1990 -1997